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Melissa Garton

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the application of:

Stefan PUSL

Serial No.: 10/024,530

Filing Date: December 21, 2001

For: SYSTEM AND METHOD FOR
ANNOUNCING AND
TRANSMITTING LINKED SHORT
MESSAGES *(AS AMENDED)*

Examiner: Not yet assigned

Group Art Unit: Not yet assigned

PRELIMINARY AMENDMENT

BOX PCT

Commissioner for Patents
Washington, D.C. 20231

Sir:

Prior to examination on the merits, please amend this application as follows:

In the Specification:

Please replace the Title with the following rewritten Title:

SYSTEM AND METHOD FOR ANNOUNCING AND TRANSMITTING LINKED SHORT
MESSAGES

In the Claims:

What is claimed is:

1. (Amended) A method for announcing and transmitting linked short messages, between a service provider and a mobile radio device in a mobile network, comprising:

checking the memory capacity in the mobile radio device prior to the transmission of at least two linked short messages to the mobile radio device; and

sending the short message after the checking determines that there is sufficient memory space to receive the short message.

2. (Amended) The method according to claim 1, wherein the check of the memory capacity in the mobile radio network is based on the free memory space indicated by the mobile radio device.

3. (Amended) The method according to claim 2, wherein the check of the memory capacity takes place in a service center of a provider.

4. (Amended) The method according to claim 2, wherein the check of the memory capacity takes place in a Home Location Register.

5. (Amended) The method according to claim 1, wherein the check of the memory capacity takes place in the mobile radio device.

6. (Amended) The method according to claim 1, wherein information about a total number of linked short messages in a first short message that is transmitted is used for checking the memory capacity in the mobile radio device.

7. (Amended) The method according to claim 6, wherein, when there is insufficient memory capacity, the mobile radio device sends an error message to the mobile network, and an entry is created in a Home Location Register or Service Center of the network.

8. (Amended) The method according to claim 6, wherein when there is sufficient memory capacity, the mobile radio device sends a message about the sufficient memory capacity to the mobile network, and the linked short messages are transmitted.

9. (Amended) The method according to claim 6, wherein in the event that sufficient memory capacity is available at a later time, the mobile network transmits a message about the

sufficient memory space to the mobile radio network, and the Home Location Register or the Service Center of the network searches linked short messages that have not been sent, and transmits them to the available memory space in the mobile radio device.

10. The method according to claim 1, wherein information about the amount of available memory is transmitted in a delivery report of an RP-ACK response.

Please add new claim 11 as follows:

11. (New) A system for announcing and transmitting linked short messages, comprising:
a service provider and a mobile radio device, wherein prior to the transmission of at least two linked short messages to the mobile radio device, the memory capacity in the mobile radio device is checked, and the short message is sent after it has been determined that sufficient memory space is available.

In the Abstract:

Please replace the Abstract with the substitute Abstract attached hereto.

REMARKS

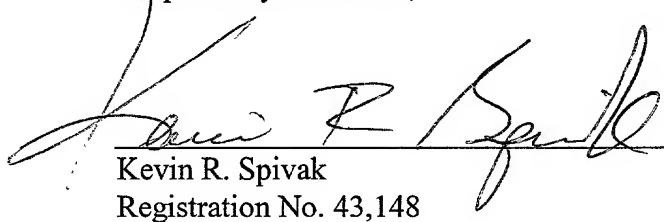
Amendments to the specification have been made and are submitted herewith in the attached Substitute Specification. A clean copy of the specification and a marked-up version showing the changes made are attached herewith. The claims and abstract have been amended in the attached Preliminary Amendment. All amendments have been made to place the application in proper U.S. format and to conform with proper grammatical and idiomatic English. None of the amendments herein are made for reasons related to patentability. No new matter has been added.

Attached hereto is a marked-up version of the changes made to the claims by the current amendment. The attached page is captioned "Version with markings to show changes made".

In the unlikely event that the transmittal letter is separated from this document and the Patent Office determines that an extension and/or other relief is required, applicant petitions for any required relief including extensions of time and authorizes the Commissioner to charge the cost of such petitions and/or other fees due in connection with the filing of this document to Deposit Account No. 03-1952 referencing docket no. 449122019900. However, the Commissioner is not authorized to charge the cost of the issue fee to the Deposit Account.

Respectfully submitted,

Dated: April 25, 2002


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VERSION WITH MARKINGS TO SHOW CHANGES MADE

For the convenience of the Examiner, the changes made are shown below with deleted text in strikethrough and added text in underline.

In the Specification:

Please replace the Title with the following rewritten Title:

SYSTEM AND METHOD FOR ANNOUNCING AND TRANSMITTING LINKED SHORT MESSAGES

In the Claims:

CLAIMS What is claimed is:

1. (Amended) A method for announcing and transmitting linked short messages (~~SMS~~), ~~preferably in the GSM or UMTS mobile radio system~~, between a service provider and a mobile radio device in a mobile network, comprising:
~~prior to the transmission of at least two linked short messages to the mobile radio device,~~
checking the maximum possible memory capacity in the mobile radio device is checked prior to the transmission of at least two linked short messages to the mobile radio device; and
sending the short message is sent in its entirety only after it has been determined the checking determines that there is sufficient memory space is available to receive the short message.
2. (Amended) The method according to claim 1, ~~characterized in that wherein~~ the check of the memory capacity in the mobile radio network is based on the free memory space indicated by the mobile radio device.
3. (Amended) The method according to claim 2, ~~characterized in that wherein~~ the check of the ~~necessary free~~ memory capacity takes place in a service center of a provider.
4. (Amended) The method according to claim 2, ~~characterized in that wherein~~ the check of the ~~necessary free~~ memory capacity takes place in ~~the~~ a Home Location Register (~~HLR~~).

5. (Amended) The method according to claim 1, ~~characterized in that~~ wherein the check of the ~~necessary free~~ memory capacity takes place in the mobile radio device.

6. (Amended) The method according to ~~one of the claims 1 through 5,~~ characterized in that claim 1, wherein information about ~~the a~~ total number of linked short messages in ~~the a~~ first short message ~~that has been or is to be transmitted~~ is used for checking the ~~necessary free~~ memory capacity in the mobile radio device.

7. (Amended) The method according to claim 6, ~~characterized in that, in the case of~~ wherein, when there is insufficient memory capacity, the mobile radio device sends an error message to the mobile radio network, and an entry is created in ~~the HLR or SC~~ a Home Location Register or Service Center of the network.

8. (Amended) The method according to ~~one of claims 6 or 7,~~ characterized in that, in the event of claim 6, wherein when there is sufficient memory capacity, the mobile radio device sends a message about the sufficient memory ~~space~~ capacity to the mobile radio network, and the linked short messages are transmitted.

9. (Amended) The method according to ~~one of claims 6 through 8,~~ characterized in that, claim 6, wherein in the event that sufficient memory capacity is available at a later time, the mobile radio network transmits a message about the sufficient memory space to the mobile radio network, and the ~~HLR or the SC~~ Home Location Register or the Service Center of the network searches linked short messages that have not yet been sent, and transmits them to the available memory space in the mobile radio device.

10. (Amended) The method according to ~~one of claims 1 through 9,~~ characterized in that the claim 1, wherein information about the amount of ~~free available~~ memory space is transmitted in a delivery report of an RP-ACK response, ~~preferably in the user data (TP-UD) or the user data header (TP-UDH) contained therein.~~

Please add new claim 11 as follows:

11. (New) A system for announcing and transmitting linked short messages, comprising:
a service provider and a mobile radio device, wherein prior to the transmission of at least
two linked short messages to the mobile radio device, the memory capacity in the mobile radio
device is checked, and the short message is sent after it has been determined that sufficient
memory space is available.

In the Abstract:

Please replace the Abstract with the substitute Abstract attached hereto.

SYSTEM AND METHOD FOR ANNOUNCING AND TRANSMITTING LINKED SHORT MESSAGES

Abstract

The invention relates to a system and method for announcing and transmitting linked short messages (SMS), preferably in the GSM or UMTS mobile radio system, between a service provider and a mobile radio device. Prior to the transmission of at least two linked short messages to the mobile radio device, the maximum possible memory capacity in the mobile radio device is checked, and the short message is sent in its entirety only after it has been determined that sufficient memory space is available.

DESCRIPTION

**SYSTEM AND METHOD FOR ANNOUNCING AND TRANSMITTING LINKED
SHORT MESSAGES**

CLAIM FOR PRIORITY

This application claims priority to Application Nos. 10064255.1 and 10133257.2 which were filed in the German language on December 22, 2000 and July 9, 2001, respectively.

TECHNICAL FIELD OF THE INVENTION

The invention relates to a system and method for announcing and transmitting linked short messages (SMS), preferably in a GSM or UMTS mobile radio system, between a service provider and a mobile radio device.

BACKGROUND OF THE INVENTION

In the widely-known GSM mobile radio system, and in the mobile radio system of the next generation, UMTS, it is possible to send short messages between the users of these systems utilizing the so-called SMS (Short Message Service). These short messages (SMS) have a maximum length of 160 characters per message. It is necessary to make available a corresponding amount of memory in the receiving mobile radio device for storing this short message. If the mobile radio device does not contain adequate free memory space, for example because too many short messages are already stored in the memory, the received short message, which at this point is only stored in the volatile working memory of the mobile radio device, is

not displayed, and an error message is sent to the respective radio network. If the user makes more space available later by deleting one or more messages from the memory, for example, the radio network is automatically informed that the mobile radio device now has free memory for receiving short messages. The network then sends the stored short messages to the respective mobile radio device. The information regarding which short-message centers contain short messages is stored in a known manner in the HLR (Home Location Register) of the mobile radio network.

The maximum 160-character message length does not allow for additional services, however. For this reason, both the GSM and UMTS standards offer the options of logically linking a plurality of short messages. Because the memory for storing short messages in a mobile radio device is limited, the number of linked short messages may be greater than the number of short messages that a mobile radio device can store in its short-message memory based on free memory space.

Consequently, the mobile radio device receives the linked short messages until the short-message memory is full, at which point the mobile radio device cannot display the entire received, linked short message, and cannot receive any further short messages.

SUMMARY OF THE INVENTION

In one embodiment of the invention, there is a method for announcing and transmitting linked short messages between a service provider and a mobile radio device in a mobile network. The method includes, for example, checking the memory capacity in the mobile radio device prior to the transmission of at least two linked short messages to the mobile radio device, and

sending the short message after the checking determines that there is sufficient memory space to receive the short message.

In another aspect of the invention, the check of the memory capacity in the mobile radio network is based on the free memory space indicated by the mobile radio device.

In another aspect of the invention, the check of the memory capacity takes place in a service center of a provider.

In yet another aspect of the invention, the check of the memory capacity takes place in a Home Location Register.

In another aspect of the invention, the check of the memory capacity takes place in the mobile radio device.

In another aspect of the invention, information about a total number of linked short messages in a first short message that is transmitted is used for checking the memory capacity in the mobile radio device.

In still another aspect of the invention, when there is insufficient memory capacity, the mobile radio device sends an error message to the mobile network, and an entry is created in a Home Location Register or Service Center of the network.

In another aspect of the invention, when there is sufficient memory capacity, the mobile radio device sends a message about the sufficient memory capacity to the mobile network, and the linked short messages are transmitted.

In another aspect of the invention, in the event that sufficient memory capacity is available at a later time, the mobile network transmits a message about the sufficient memory space to the mobile radio network, and the Home Location Register or the Service Center of the

network searches linked short messages that have not been sent, and transmits them to the available memory space in the mobile radio device.

In yet another aspect of the invention, information about the amount of available memory is transmitted in a delivery report of an RP-ACK response.

In another embodiment of the invention, there is a system for announcing and transmitting linked short messages. The system includes, for example, a service provider and a mobile radio device, wherein prior to the transmission of at least two linked short messages to the mobile radio device, the memory capacity in the mobile radio device is checked, and the short message is sent after it has been determined that sufficient memory space is available.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 illustrates an exemplary embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

~~It is therefore the object of the invention to~~ The invention discloses a system and method for announcing and transmitting linked short messages, which allows simple, individual short messages as well as linked short messages to be sent in such a way that they can always be displayed in their entirety on the mobile radio device.

~~This object is accomplished by the features of claim 1. The dependent claims disclose advantageous modifications of the invention.~~

Accordingly, the ~~inventor proposes to~~ invention improves ~~improve~~ the known system and method for announcing and transmitting linked short messages, preferably in the GSM or UMTS mobile radio system, between a service provider and a mobile radio device such that, before at

least two linked short messages are sent to the mobile radio device, the maximum possible memory capacity in the mobile radio device is checked, and the short message is sent in its entirety ~~only~~ after it has been ascertained that sufficient memory space is available.

In a ~~modification~~ one embodiment of the invention, the check of the necessary free memory capacity in the mobile radio network is based on the free memory space reported by the mobile radio device; the check of the necessary free memory capacity preferably takes place in the mobile radio device itself.

~~It is, however, also possible for the check of~~ In one aspect of the invention, the check of the necessary free memory capacity in the mobile radio device to be made with information about the total number of linked short messages in the first short message that has been or is to be transmitted, so the check can be made subsequently in the mobile radio network, for example in the HLR (Home Location Register) or in the SC (Service Center).

Moreover, in an advantageous embodiment of the method, ~~it is proposed that,~~ in the event that insufficient memory capacity is available, the mobile radio device sends an error message to the mobile radio network and a corresponding entry is created in the HLR of the network.

A further embodiment of the method provides that, if sufficient memory capacity is available, the mobile radio device sends a message about the sufficient memory space to the mobile radio network, and the linked short messages are transmitted.

~~It can also be provided that~~ In another aspect of the invention, in the event of sufficient memory capacity available at a later time, the mobile radio device sends a message about the sufficient memory space to the mobile radio network, and the HLR of the network searches linked short messages that have not yet been sent and transmits them to the available memory space in the mobile radio device.

In accordance with the invention, the information about the amount of free memory can also be transmitted in a so-called deliver report with an RP-ACK message, according to the known protocol, in the connection between the mobile radio device and the base station. This is the response that the mobile radio device sends to the sender when an SMS is announced. This response is preferably transmitted in the user data (TP-UD) or the user-data header (TP-UDH) ~~contained~~ included therein.

An exemplary, concrete embodiment of the system and method in accordance with the invention can be described as follows:

After the mobile radio device has been activated, it sets an internal variable AK to a value that is greater than the total memory space that is available for short messages.

When a short message is received, the mobile radio device ascertains whether this first short message is a portion of a linked short message. If this is the case, the mobile radio device extracts from the message how many linked short messages comprise the entire short message. If sufficient memory space is available, the linked short message is received and stored. If insufficient space is available, the mobile radio device sends an error message to the network with the reason "linked short message exceeds the available short-message storage." If the number of linked short messages is smaller than AK, AK is overwritten with the smaller number of linked short messages. As soon as at least AK memory space is free in the mobile radio device, the mobile radio device sends a message to the network that free space is available for linked short messages.

In the network, after an error message, "linked short message exceeds the available short-message storage" has been received, an entry is created in a register in the HLR (Home Location

Register) with the reason “mobile station memory capacity for concatenated short messages exceeded flag.”

This new entry ~~contains~~ includes the address SC of the service center. If such an entry is already present, no new entry is created. If a mobile radio device sends a message to the network that free space is available for linked short messages, the HLR informs the various service centers for which the entry with the reason “mobile station memory capacity for concatenated short messages exceeded flag” is present.

With this system and method, a mobile radio device does not receive linked short messages until it signals that sufficient memory space is available for receiving the entire linked short message.

**SYSTEM AND METHOD FOR ANNOUNCING AND TRANSMITTING LINKED
SHORT MESSAGES**

CLAIM FOR PRIORITY

This application claims priority to Application Nos. 10064255.1 and 10133257.2 which were filed in the German language on December 22, 2000 and July 9, 2001, respectively.

TECHNICAL FIELD OF THE INVENTION

The invention relates to a system and method for announcing and transmitting linked short messages (SMS), preferably in a GSM or UMTS mobile radio system, between a service provider and a mobile radio device.

BACKGROUND OF THE INVENTION

In the widely-known GSM mobile radio system, and in the mobile radio system of the next generation, UMTS, it is possible to send short messages between the users of these systems utilizing the so-called SMS (Short Message Service). These short messages (SMS) have a maximum length of 160 characters per message. It is necessary to make available a corresponding amount of memory in the receiving mobile radio device for storing this short message. If the mobile radio device does not contain adequate free memory space, for example because too many short messages are already stored in the memory, the received short message, which at this point is only stored in the volatile working memory of the mobile radio device, is not displayed, and an error message is sent to the respective radio network. If the user makes more space available later by deleting one or more messages from the memory, for example, the

radio network is automatically informed that the mobile radio device now has free memory for receiving short messages. The network then sends the stored short messages to the respective mobile radio device. The information regarding which short-message centers contain short messages is stored in a known manner in the HLR (Home Location Register) of the mobile radio network.

The maximum 160-character message length does not allow for additional services, however. For this reason, both the GSM and UMTS standards offer the options of logically linking a plurality of short messages. Because the memory for storing short messages in a mobile radio device is limited, the number of linked short messages may be greater than the number of short messages that a mobile radio device can store in its short-message memory based on free memory space.

Consequently, the mobile radio device receives the linked short messages until the short-message memory is full, at which point the mobile radio device cannot display the entire received, linked short message, and cannot receive any further short messages.

SUMMARY OF THE INVENTION

In one embodiment of the invention, there is a method for announcing and transmitting linked short messages between a service provider and a mobile radio device in a mobile network. The method includes, for example, checking the memory capacity in the mobile radio device prior to the transmission of at least two linked short messages to the mobile radio device, and sending the short message after the checking determines that there is sufficient memory space to receive the short message.

In another aspect of the invention, the check of the memory capacity in the mobile radio network is based on the free memory space indicated by the mobile radio device.

In another aspect of the invention, the check of the memory capacity takes place in a service center of a provider.

In yet another aspect of the invention, the check of the memory capacity takes place in a Home Location Register.

In another aspect of the invention, the check of the memory capacity takes place in the mobile radio device.

In another aspect of the invention, information about a total number of linked short messages in a first short message that is transmitted is used for checking the memory capacity in the mobile radio device.

In still another aspect of the invention, when there is insufficient memory capacity, the mobile radio device sends an error message to the mobile network, and an entry is created in a Home Location Register or Service Center of the network.

In another aspect of the invention, when there is sufficient memory capacity, the mobile radio device sends a message about the sufficient memory capacity to the mobile network, and the linked short messages are transmitted.

In another aspect of the invention, in the event that sufficient memory capacity is available at a later time, the mobile network transmits a message about the sufficient memory space to the mobile radio network, and the Home Location Register or the Service Center of the network searches linked short messages that have not been sent, and transmits them to the available memory space in the mobile radio device.

In yet another aspect of the invention, information about the amount of available memory is transmitted in a delivery report of an RP-ACK response.

In another embodiment of the invention, there is a system for announcing and transmitting linked short messages. The system includes, for example, a service provider and a mobile radio device, wherein prior to the transmission of at least two linked short messages to the mobile radio device, the memory capacity in the mobile radio device is checked, and the short message is sent after it has been determined that sufficient memory space is available.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 illustrates an exemplary embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

The invention discloses a system and method for announcing and transmitting linked short messages, which allows simple, individual short messages as well as linked short messages to be sent in such a way that they can always be displayed in their entirety on the mobile radio device.

Accordingly, the invention improves the known system and method for announcing and transmitting linked short messages, preferably in the GSM or UMTS mobile radio system, between a service provider and a mobile radio device such that, before at least two linked short messages are sent to the mobile radio device, the maximum possible memory capacity in the mobile radio device is checked, and the short message is sent in its entirety after it has been ascertained that sufficient memory space is available.

In one embodiment of the invention, the check of the necessary free memory capacity in the mobile radio network is based on the free memory space reported by the mobile radio device; the check of the necessary free memory capacity preferably takes place in the mobile radio device itself.

In one aspect of the invention, the check of the necessary free memory capacity in the mobile radio device to be made with information about the total number of linked short messages in the first short message that has been or is to be transmitted, so the check can be made subsequently in the mobile radio network, for example in the HLR (Home Location Register) or in the SC (Service Center).

Moreover, in an advantageous embodiment of the method, in the event that insufficient memory capacity is available, the mobile radio device sends an error message to the mobile radio network and a corresponding entry is created in the HLR of the network.

A further embodiment of the method provides that, if sufficient memory capacity is available, the mobile radio device sends a message about the sufficient memory space to the mobile radio network, and the linked short messages are transmitted.

In another aspect of the invention, in the event of sufficient memory capacity available at a later time, the mobile radio device sends a message about the sufficient memory space to the mobile radio network, and the HLR of the network searches linked short messages that have not yet been sent and transmits them to the available memory space in the mobile radio device.

In accordance with the invention, the information about the amount of free memory can also be transmitted in a so-called deliver report with an RP-ACK message, according to the known protocol, in the connection between the mobile radio device and the base station. This is the response that the mobile radio device sends to the sender when an SMS is announced. This

response is preferably transmitted in the user data (TP-UD) or the user-data header (TP-UDH) included therein.

An exemplary, concrete embodiment of the system and method in accordance with the invention can be described as follows:

After the mobile radio device has been activated, it sets an internal variable AK to a value that is greater than the total memory space that is available for short messages.

When a short message is received, the mobile radio device ascertains whether this first short message is a portion of a linked short message. If this is the case, the mobile radio device extracts from the message how many linked short messages comprise the entire short message. If sufficient memory space is available, the linked short message is received and stored. If insufficient space is available, the mobile radio device sends an error message to the network with the reason "linked short message exceeds the available short-message storage." If the number of linked short messages is smaller than AK, AK is overwritten with the smaller number of linked short messages. As soon as at least AK memory space is free in the mobile radio device, the mobile radio device sends a message to the network that free space is available for linked short messages.

In the network, after an error message, "linked short message exceeds the available short-message storage" has been received, an entry is created in a register in the HLR (Home Location Register) with the reason "mobile station memory capacity for concatenated short messages exceeded flag."

This new entry includes the address SC of the service center. If such an entry is already present, no new entry is created. If a mobile radio device sends a message to the network that free space is available for linked short messages, the HLR informs the various service centers for

which the entry with the reason “mobile station memory capacity for concatenated short messages exceeded flag” is present.

With this system and method, a mobile radio device does not receive linked short messages until it signals that sufficient memory space is available for receiving the entire linked short message.